



High Temperature Superconductivity Space Experiment (HTSSE II)



The Naval Research Laboratory (NRL) has designed, built and integrated a high temperature superconductivity (HTS) space experiment platform called HTSSE II which has successfully demonstrated the feasibility of incorporating the revolutionary technology of HTS into space systems.

The HTSSE II payload is an integral part of the Advanced Research and Global Observation Satellite (ARGOS) which was launched on a Delta II rocket from Vandenberg AFB California on 23 February 1999. The payload contained a number of advanced components and subsystems which employed HTS components and conventional semiconductor components, the latter operating either at cryogenic or space ambient temperatures.

There are seven experiments on the HTSSE II platform:

- Cueing receiver from MIT/Lincoln Labs
- Delay line and channelizer from Westinghouse (Pittsburgh)
- Digital instantaneous frequency measurement system from Conductus
- Four channel multiplexer from ComDev
- Channelized receiver from NRL
- Josephson junction experiment from NRL
- Digital multiplexer from TRW

After reaching orbit, the various HTS components were tested periodically, nominally once per week. The on-orbit data from all of the devices exhibited essentially no change from their performance prior to launch. Thus this experiment has conclusively demonstrated that HTS is a viable, manufacturable, radiation hard and space qualified electronic technology suitable for space deployment. The primary objectives of the HTSSE program were to focus HTS research on space applications, leverage ongoing research and development in HTS, and speed the transition of HTS components and subsystems from the laboratory into space.

Sponsors and Co-Sponsors are:

- National Reconnaissance Office (NRO)
- U. S. Navy
- Defense Advanced Research Projects Agency (DARPA)
- Ballistic Missile Defense Office (BMDO)
- National Aeronautics and Space Administration (NASA)
- Corporate IR&D programs
- Canadian government
- German government

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